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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/724,126   | 12/01/2003  | Hongyong Zhang       | 0756-7224           | 1218             |
| 31780  | 7590        | 10/05/2005           | EXAMINER            |                  |
| ERIC ROBINSON<br>PMB 955<br>21010 SOUTHBANK ST.<br>POTOMAC FALLS, VA 20165 |             |                      | DEO, DUY VU NGUYEN  |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 1765                |                  |

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/724,126

Applicant(s)

ZHANG ET AL.

Examiner

DuyVu n. Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-7 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 8-18 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☒ Certified copies of the priority documents have been received in Application No. 07/971,237.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/1/03, 2/27/04, 8/11/04, 9/1/04, 5/4/05
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

IDS considered: 8/11/04, 9/1/04, 5/4/05

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoerschelmann et al. (US 4,434,036).

Hoerschelmann describes a method for doping a semiconductor substrate comprising: holding a substrate 3 in a chamber (fig. 3); introducing a gas containing dopant species into the chamber and producing a plasma (col. 4, line 15-33); introducing the dopant species from the plasma into the target portion of the substrate (col. 4, line 35-40); moving the substrate in and out of the chamber (claimed changing a relative position of the substrate in the chamber) (fig. 5). Unlike claimed invention, Hoerschelmann doesn't describe the target portion is line-shaped. However, one skilled in the art at the time of the invention would find it obvious to dope any shape on a semiconductor substrate depending on the semiconductor device being fabricating with a reasonable expectation of success.

Referring to claims 9 and 14, the method further comprising heating the substrate (col. 2, line 34-38).

Referring to claims 11, 12, 16, 17, the dopant includes PH<sub>3</sub> and diboran (col. 4, line 24-26).

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Referring to claim 18, it is obvious that the semiconductor substrate device can include any structure such as thin film transistor, which is known to one skilled in the art (please also see pages 1-3) to have dopants introduced into the substrate to form source and drain regions.

3. Claims 1, 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoerschelmann and Arima et al. (US 4,465,529)

Referring to claim 1, Hoerschelmann describes further applying electromagnetic energy to the gas atmosphere when forming the plasma to cure the substrate by using a laser beam (col. 1, line 46-50; col. 2, line 45-50). Unlike claimed invention, he doesn't describe irradiating the laser in the gas atmosphere while applying the electromagnetic energy. Arima teaches a same method of doping the substrate wherein he describes that the laser beam can be applied during or after the doping process (col. 2, line 30-45). One skilled in the art would find it obvious at the time of the invention in light of Arima to apply the laser either or after the doping to introduce the impurities into the substrate with a reasonable expectation of success. Applying the laser during the doping would providing claimed method of applying the electromagnetic energy while irradiating the laser beam. Furthermore, scanning the linear laser beam would be obvious in order to cover all the doping portion of the substrate.

***Allowable Subject Matter***

4. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 3 is allowable because applied prior art doesn't describe or

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suggest the step of heating the semiconductor at a temperature not higher than a crystallization temperature of the semiconductor while applying the electromagnetic energy.

5. Claims 4-7 are allowed because applied prior art doesn't teach or suggest irradiating the semiconductor film with a laser light through a window having a slit shape while transferring the substrate so that the dopant species is introduced into (or irradiated portion of) the semiconductor film.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 4, 5, 8-18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 6,358,784. Although the conflicting claims are not identical, they are not patentably distinct from each other because they describe a method for doping a semiconductor substrate with a gas containing dopants and while moving the substrate.

8. Claims 1-18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-24 of U.S. Patent No. 5,424,244. Although the conflicting claims are not identical, they are not patentably distinct from each other because they

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describe a method for doping a semiconductor substrate with the use of laser and electromagnetic energy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-2:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Primary Examiner

Duy-Vu N. Deo

10/3/05

